

Subject: Mathematics

Grade: Eighth

Standard: #4 Computation and Estimation
#8 Algebra

Key Concept: Students practice mental calculations by recognizing patterns and relationships among integers.

Generalization: Students do mental calculations using symmetry and looking for visual patterns.

Background:

This lesson could be an activity for anytime of the year. Each tier provides a fun way of practicing mental addition, looking for visual patterns, and recognizing symmetry. Consequently, students should be adept at mental addition and familiar with recognizing patterns.

This lesson is adapted from the book Math for Humans, ISBN#0-9656414-7-3.

This lesson uses magic squares which originated in China and have mainly been studied since the seventeenth century. These activities are designed to reinforce mental calculations as students total various arrangements that make 34. Begin the lesson as a whole class but have the students arranged in their tiers and do the first part of “The Code Square” found on page 4-2 of the reference. This forms the basis for all the other activities as students become familiar with and recognize the patterns found in a 4-by-4 Magic Square. Students may work in pairs or individually within the tiers.

This lesson is tiered in *process* according to Howard Gardner’s *Multiple Intelligences*.

Tier I: *Linguistic Learners*

Students continue using the Magic “Code Square” to play the word and code game using the rules found on page 4-2 of the reference.

Tier II: *Logical-Mathematical Learners*

Pairs of students complete “A Box of Patterns” on page 4-6 of the reference.

You might also have some of these learners create new Magic Squares by following the directions on page 4-8 of the reference.

Tier III: *Spatial Learners*

Students play the “Rune Square” game following the rules found on page 4-4 of the reference. You might also have some of these learners follow the directions for making a design surprise on page 4-7 of the reference.

Tier IV: *Musical Learners*

Students make musical designs using the piano or other musical instrument following the directions on page 4-8 of the reference.

Assessment:

Use observation and questioning as you visit each tier to assess this lesson.

A nice extension would be to have students work with 3-by-3 or 5-by-5 Magic Squares.